

Melting



Pillar is your partner for induction melting solutions



“Do more with less” — this is the challenge you face every day. Make the most of your existing resources. Maximize your return on new technology. And do it all while keeping your line up, running and profitable. Achieving this balance is difficult. When rising to the challenge, it helps to have a partner — both a technology provider and an expert on how to implement it. When the right technology for ferrous and nonferrous melting is induction, the right partner is Pillar.

A Heritage of Excellence

Pillar Induction is a leading supplier of induction heating and melting equipment. Reflecting the proud heritage of our group of companies, Pillar, Westinghouse and Cycle-Dyne, our personnel and innovative traditions remain central to our strategy and future. Our high-quality standards match our reputation, as does our expertise in process engineering and modernization — all resulting in stable, long-term solutions that last for decades.

Continuous Innovation

Not only are we one of the largest induction suppliers, we are one of the most progressive, not to mention a market leader in developing customer-valued new technology. 3D CAD simulations, state-of-the-art manufacturing capabilities, application laboratories, and on-staff metallurgists guarantee that our customers always stay ahead of the industry.

Your Process Partner

Through close collaboration and personal attention, Pillar is dedicated to sharing our customers' passion and focus on their business goals. Pillar doesn't just sell equipment, we provide the right solution. We optimize your floor plan. We streamline your energy consumption. By applying our years of experience and knowledge of best practices, our customers are empowered to compete more effectively.

Customer Service and Support

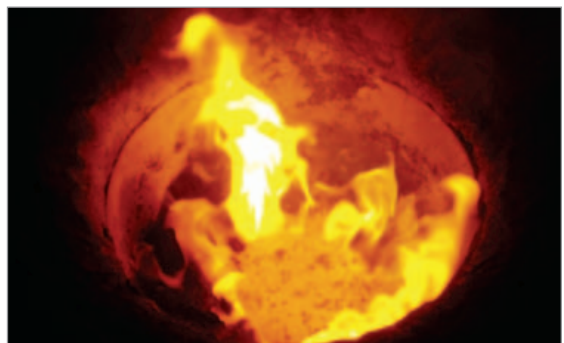
Before the contract is signed and for years beyond start-up, customers can count on Pillar. Whether creating a turnkey solution from scratch, retrofitting and updating your existing lines, or evaluating future possibilities, the level of service is the same. Our maintenance specialists are available 24 / 7 and customers can enroll in preventive maintenance contracts to keep their lines up and running. All day. Every day.

Pillar Support Network

Along with personalized service, Pillar customers can benefit from the resources of a global corporation. We provide global assistance through our network of regional service engineers in China, England, Germany, Japan, Korea and Mexico. Wherever you are, we can help.

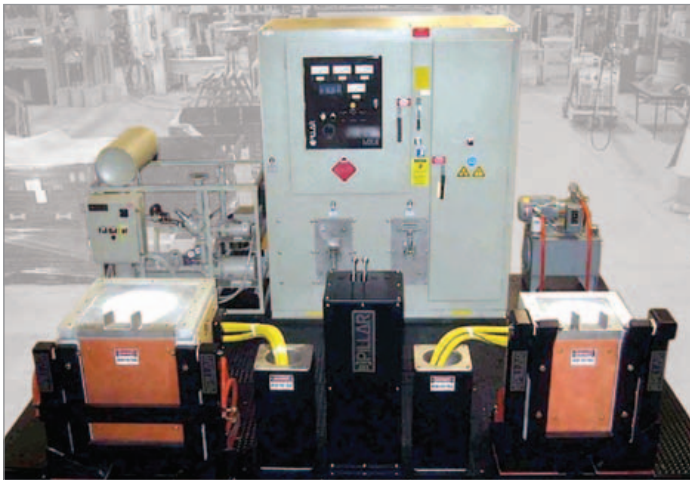
Solutions Designed for You

When you have unique requirements, Pillar can tailor a solution based on our extensive application experience. Through a combination of standard products and innovative engineering, Pillar can meet your most demanding production and quality needs. With a wide range of field-proven solutions, our engineering team can provide the experience and expertise to optimize your process.



Melting Applications

Pillar's Induction Melting Division has a long history of supplying induction melting systems for a variety of applications throughout the foundry industry. We pride ourselves on supplying the most reliable, durable and efficient equipment available to the industry today. Our line of induction melting furnaces range in capacity from 1 pound to 20 Tons. Pillar offers coreless induction systems for the following applications: **Small Ferrous Systems, Large Ferrous Systems, and Nonferrous Systems**



System offerings and capabilities include:

- Dual output power supplies
- Lift/Swing and crucible melting furnaces for non-ferrous melting
- Shunted steel frame furnaces
- Medium and large capacity steel shell furnaces
- Investment casting systems
- Precious metal melting systems
- Vacuum melting power supplies and furnaces
- Graphite susceptor heating systems
- Water cooling systems
- Turn-key melting systems
- Furnace, coil and water-cooled lead repair

Nonferrous Melting

Pillar offers a variety of Furnaces for the Nonferrous metal industry, each designed to meet a specific need. Our product offering includes small systems, designed to melt and pour multiple alloys and high powered systems developed for large scale processing.

If you are looking for innovative solutions to match your production needs, look no further than Pillar Induction. Our experienced staff will work with you to provide the most cost effective and productive Induction melting system available.

Smaller Systems

Nonferrous Systems Lift/Swing Furnaces are available with hoist and hydraulic designs for crucible sizes ranging from #40 to #225. Important characteristics include:

- Rapid Alloy Changeover without Contamination
- Reduced Pouring Temperatures
- Utilization Rates near 100%
- Optional Fume Collection Ring Available

Larger Systems

Aluminum Box, Steel Frame and Steel Shell Furnaces are available in capacities from 50 lbs to 20 tons. Operational frequencies are selected to match each application and vary between 120 and 3000 Hz, with other frequencies available. Use with a rammed type lining or crucible is possible. Optional fume collection is available.





Ferrous Melting

Pillar offers a variety of furnaces for ferrous melting applications. Our product offering includes box and steel frame furnaces for smaller applications, and steel shell furnaces for the larger foundry applications. All Pillar furnaces are designed to handle the toughest of foundry environments.

Optional items available include:

- Closed Capture Hoods or Fume Collection Rings
- Lining Pushout Devices
- Furnace Weighing Systems
- Back Tilting
- Double Trunion

Precious Metal Melting

Pillar offers cost effective systems for melting, recycling, refining, and casting precious metals such as Gold, Silver, and the Platinum Metals Group (PMG).



Specialty Melting

As an innovator in the development of induction technology, Pillar offers a wide array of unique solutions designed to meet the specific melting needs of your material including:

- Glass
- Silicon
- Graphitization
- Refining
- Vacuum or Atmosphere Melting

Furnace Technology



Lift/Swing Furnace

Capacity: #40 – #225

40 lbs – 225 lbs aluminum capacity

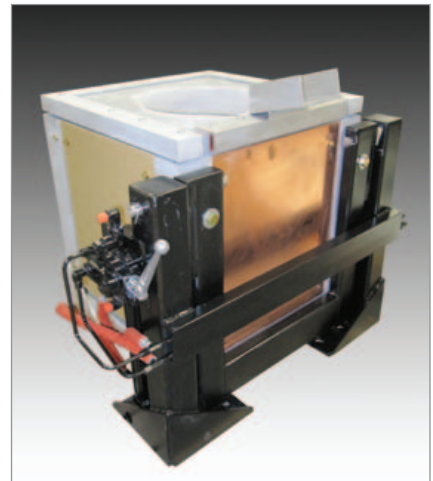
120 lbs – 675 lbs brass capacity

The Lift/Swing furnace is an original Pillar design. Used specifically in non-ferrous applications, the two crucible design yields close to 100 percent utilization. The Lift/Swing design employs a stationary crucible design; where the operator moves the coil, not the crucible full of molten metal. Its close coupled design permits the fastest melt rate possible and rapid alloy changeover without fear of material contamination.

Box Furnace

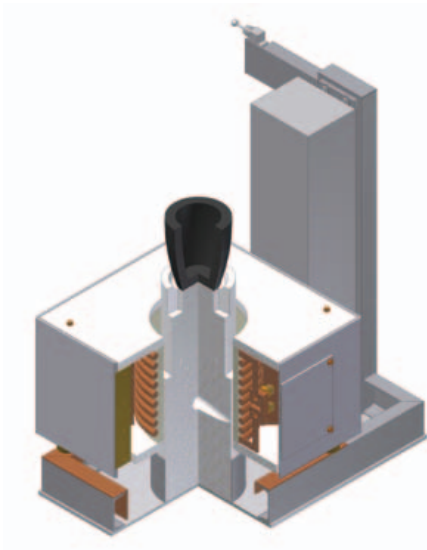
Capacity: 50 lbs – 2,000 lbs*

The flexible design includes removable side panels and through bolt connections for easy coil access. The hydraulic tilting assembly uses high quality cylinders, industrial tilt control valves and flow valves that ensure a controlled descent rate. The tilt angle is a full 105° for easy removal of all molten material. The Box Furnace is available in either standard or nose tilt designs.



Autopour

The Autopour is configured with a combination of a ladle and small holding furnace. Molten material is introduced into the holding furnace then electrically tilted (not hydraulically) for more precise pours during the ladle transfer and pour. Load cells on both the furnace and ladle assure accurate volumes of material are transferred to the mold line.



Hand Furnace

Capacity: 3 lbs – 50 lbs*

The Hand Furnace incorporates a refractory fiber reinforced shell, top and bottom. The induction coil is terminated for use with water cooled leads. The Hand Furnace is also available with a hydraulic assist for tilting larger quantities of material.



Drop Coil Furnace

Capacity: #3 - #30

3 lbs – 30 lbs aluminum capacity

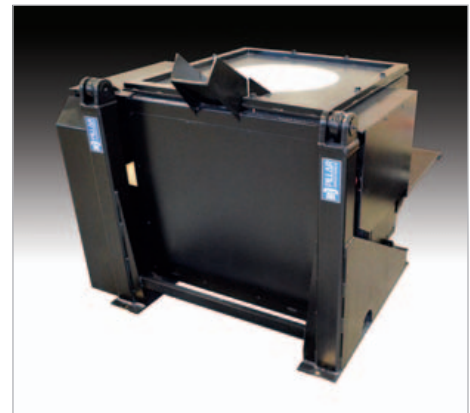
9 lbs – 90 lbs brass capacity

The Drop Coil Furnace is designed for use with a single, free-standing crucible for melting non-ferrous metals. Features include a high efficiency coil, fabricated steel furnace base, confinement area, refractory pedestal for crucible support, pneumatic cylinder and flow control valves.

Steel Frame Furnace

Capacity: 100 lbs – 3,000 lbs*

The Steel Frame furnace is rugged and durable, but above all, practical. The coil is fully supported in the steel frame and surrounded by magnetic containment shunts. This structure ensures that the lining is not mechanically stressed when tilting the furnace. Field experience has shown a better than 35 percent improvement in lining life when compared with a conventional box furnace. Similarly, the castable in the top and bottom of the furnace is fully supported and plays no part in the mechanical integrity of the furnace. The optional refractory lined lid ensures maximum efficiency, especially with higher temperature metals. A fume ring is also available.



Steel Shell Furnace

Capacity: 2,000 lbs – 44,000 lbs*

The Steel Shell furnace is designed to handle the toughest of foundry environments. With its rolled steel shell, heavy-duty shunts and machined termination blocks, the Pillar Steel Shell furnace ranges in size from 1 to 20 tons and can withstand many years of punishment. The construction of the Steel Shell furnace provides total maintenance accessibility.

*Steel Capacity

Power Supplies & Controls

As the originator of the solid state power supply, Pillar Induction provides reliability, quality and efficiency in our market-leading product line. Pillar offers a wide range of IGBT and SCR power supplies with output frequencies of 120 Hz through 10 kHz, and power output up to 6 megawatts. The MK-Series of power supplies provides the consistent and reliable power which is necessary for critical melting applications. In conjunction with real time process feedback including temperature monitoring, the MK-Series power supply offers simple operation and maintenance. With thousands of MK-Series power supplies installed around the world, Pillar offers a proven solution for the most demanding production needs.

MK8 – SCR Power Supply

Power Range: 50kW – 1,250kW

Frequency: 200Hz – 3,000Hz

The MK8 is a voltage source inverter with a parallel tuned output. This power supply is designed as an economic and reliable solution for applications up to 1,250 kW. The parallel tuned circuit keeps the high currents away from the inverter thyristors (SCR), resulting in lower power loss and higher efficiency.

Operation is a combination of rectifier voltage control at lower power levels and inverter swept frequency at higher power levels. This provides consistent starting and excellent fault protection, along with constant output power over the entire melting cycle. Accurate and reliable control is achieved in extreme ambient conditions without the need for additional cooling.

Safety features include current leakage detector with meter to monitor the flow of electrical current to ground, preventing operation in the event molten metal has penetrated the refractory near the coil.



MK8

Furnace Selector Switches

The knife blade switches are standard options in MK8 to allow alternate selection of furnaces. The cast aluminum handles are located on the power supply to permit easy access.



Furnace Selector Switches

Remote Operator Panel

The Remote Operator Panel is a convenient option for installations where the power supply is located a distance away from the furnace.



Remote Operator Panel

MK11 – IGBT Power Supply

Power Range: 100kW – 750kW

Frequency: 1kHz – 10kHz

The MK11 is an energy efficient, voltage source inverter with a parallel-tuned output. This IGBT power supply offers a wide tuning range and is available in both local and remote heat station configurations. This simplifies integration into new systems or existing installations. Selectable output regulation modes include voltage, kW, or current.



MK11



MK15

MK15 – IGBT Power Supply

Power Range: 600kW – 3,000kW

Frequency: 120Hz – 10,000Hz

The MK15 is a voltage source inverter with a series tuned output. This IGBT power supply features low loss, transistorized devices, with an embedded microprocessor control and fiber optic control firing.

MK17 – SCR Power Supply

Power Range: 750kW – 6,000kW

Frequency: 200Hz – 3,000Hz

The MK17 is a current source, parallel tuned output which allows for relatively low currents through the SCR's without the need for series reactors.

The SCR current is accurately controlled under both normal and fault conditions by using high speed electronic controls together with a large choke. This level of control is essential at the larger power levels to ensure equipment reliability.

The combination of current control, voltage control and electronic sophistication allows the power supply to be turned on and off at any selected power level.



MK17

Coils & Accessories

New & Retrofit

The key to every induction melting application is the coil. Whether it is a total rebuild of your induction furnace or the design and manufacture of a precision coil, Pillar's team of highly skilled craftsmen are ready to meet all of your induction coil needs. Pillar utilizes many innovative coil designs and manufacturing techniques to achieve proper melting of your product. Trust your application to our experts who will provide the most efficient and productive solutions. Coils are designed by our team of engineers and manufactured in-house, to provide high quality products at a competitive price.

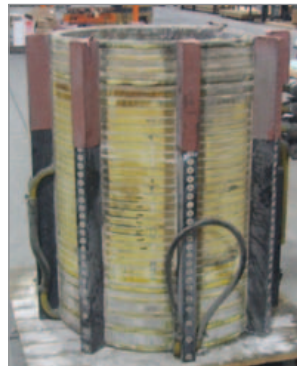


Repair & Rebuild

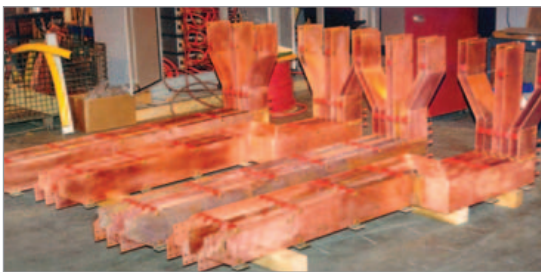
Pillar has the expertise to rebuild or repair all types of coil designs, including:

- Segmented Coils
- Studded Coils
- Vacuum Coils
- Cast Refractory Blocks – Top and Bottom Castables, Pushout Blocks, Crucible Support Pedestals
- Mica Slip Plane Material
- Clay Graphite or Silicon Carbide Crucibles
- Coil Grouting – Straight Wall, Tapered Grout, Colored Grout
- Magnetic Field Containment Shunts/Yokes
- Shunt Insulating Materials

Before



After



Bus Bar

Bus Bar

High Conductivity Copper Bus Bar for interconnection between the power supply and the water cooled leads which connect to the furnace. The bus bar will be fabricated to fit your particular installation configuration.

Molten Bath Ground Continuity Tester

Never operate your melting system without a fully functional ground and leak detection system. It is important to regularly check the ground test probe in the bottom of your furnace. In regular operation, the ground probes can be covered during incorrect furnace relining, burn off or be covered with slag preventing them from functioning in the leak detector circuit.



Accessories

Decking

Melt-Deck Package to provide an enclosure for the melt system components and an operating platform for the melt system. Includes a rugged steel structural frame, removable steel tread plate decking, high impact steel ventilation plates, and interconnection for power, water and hydraulics.

DC Emergency Water System

Battery (DC) Powered Emergency Re-circulating System to provide up to 8 hours of furnace water recirculation in case of a power failure.

Furnace Selector Contactors

On larger systems with high furnace currents, the self-cleaning, water-cooled pneumatic contactor switches are used to alternate furnace selection. Furnace Selector Contactors are mounted in the bus bar system for trench installation to permit alternate selection of furnaces. Each set is interlocked and controlled by a furnace selector control switch located at the power supply and/or the remote control panel.

Fume Collection Ring

Is a side draft extraction design that encompasses the furnace bath perimeter about the top of the furnace. The outlet is connected to a customer supplied exhaust system at a rotating duct connection located on the tilting axis.

Liner Push-out

Hydraulic actuated, furnace bottom mount Lining Extraction Device (Hydraulic Ram). Actuation and retraction control is provided by the furnace lid control valve in a bypassed mode.

Water Systems

Pillar offers a range of cooling options for the power supply and furnace coil including evaporative tower systems, dry coolers, and chillers.

Pump Stations — Single and Dual

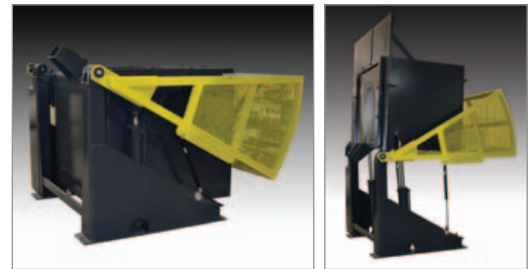
Closed Pressurized Pumping Station satisfies the flow requirements of a power supply and furnaces. Systems are designed to be used with a dry or evaporative cooler. This system includes a bronze fitted pump and motor, air elimination system, alarm circuit, internal copper piping and wiring and disconnect. Also available in a dual pump configuration.

Water Cooled Power Leads

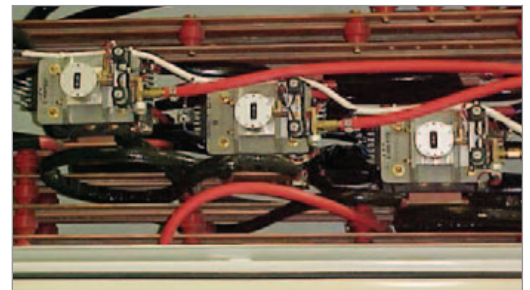
Provide the flexible connection of the furnace power to the furnace as well as provide a path and connection for furnace cooling water.



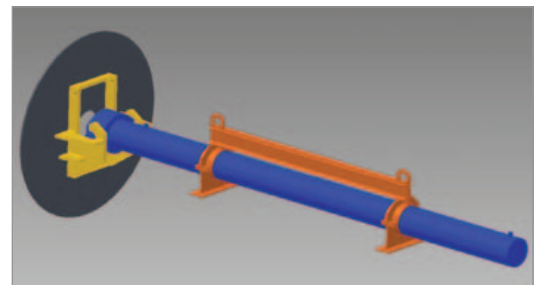
Dual Pump Station with Integrated DC Emergency Water System



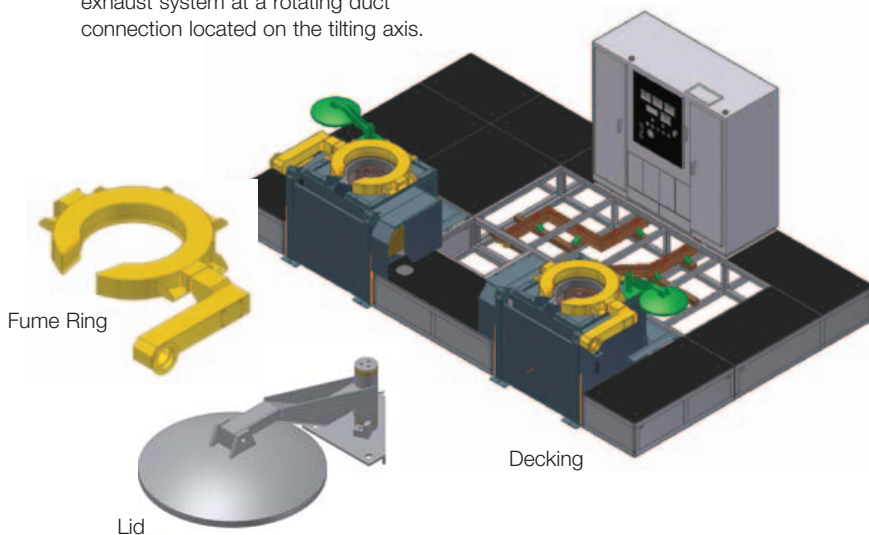
Safety Gate in Neutral and Tilt Positions



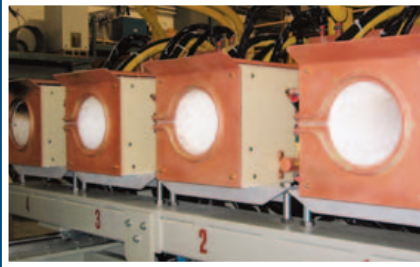
Furnace Selector Contactors



Lining Push-out



Support



Melting

Materials

- Ferrous
- Non-Ferrous
- Precious Metal Melting

Coreless Furnace Styles

- Rolled Steel Shell
- Steel Frame
- Box
- Lift / Swing
- Lift Coil / Drop Coil
- Hand Furnace
- Bottom Pour
- Roll Over Furnace
- Holding Furnace

Custom Applications

- Vacuum Melting
- Crucible Melters
- Graphite Susceptor Melting
- Alloy Recovery

Control Systems

- Melt Monitor
- Sintering Cycle
- Autopour Systems
- Leak Detection & Testing
- Custom Applications

Heating

Tube & Pipe

- Heat Quench & Temper
- Upsetting
- Seam Annealing
- Normalizing
- Coating & Galvanizing
- Stress Relieving

Forging & Forming

- Billet Heating
- Bar End Heating

Heat Treatment

- Horizontal & Vertical Scanners
- Single Shot
- Lift & Rotate
- Automated Pick & Place
- Tooth-by-Tooth Gear Hardening

Specialty Heating

- Wire Heating
- Brazing & Soldering
- Shrink-Fitting
- Crystal Growing

After-Market

Induction Coils

- Repairs
- Rebuilds
- New & Retrofit

Spare & Replacement Parts

- SCR's Diodes, and IGBT's
- Capacitors
- Water Cooled Power Leads
- Bus Bars
- Control Boards

Retrofit & Refurbishments

- Controls Upgrades
- Heat Station Rebuilds
- Equipment Upgrades
- Water System Replacements

Repair Services

- Control Boards
- Water Cooled Power Leads

Field Service

- Preventative Maintenance
- Training
- Documentation
- Thermal Imaging Analysis
- 24-Hour Service Hotline

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